



CHANGEMENT CLIMATIQUE

CLIMATE CHANGE

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| Lecturers : 16.0 | TC : 0.0 | PW : 0.0 | Autonomy : 0.0 | Study : 12.0 | Project : 0.0 | Language : AN

Objectives

While there is now a consensus that climate change is accelerating, there is still no agreement on measures to mitigate it. The reduction in emissions of greenhouse gases is occurring too slowly to prevent global warming. The consequences of climate change will therefore affect almost all aspect of our lives and they will have to be taken into account in projects in all fields of engineering. It will probably also be necessary to consider intervening directly in climate processes, at planetary scale, and various strategies have already been proposed. The objective of this course is to provide a general understanding of the physics of climate change and of the related issues. It will provide future

Keywords : Climate change, greenhouse gases, carbon, paleoclimatology, warming, oceans, atmosphere, meteorology, modeling, dynamical systems

Programme

Introduction: Definition of climate, main processes, evidence of recent climate changes
Radiative transfers: Solar radiation, the atmosphere as a filter, aerosols and clouds
Radiative forcing, Climate sensitivity, feedbacks
Atmospheric and oceanic circulation
Climate reconstruction: metrology, the history of the climate
Carbon cycle: Mechanisms of carbon transfer, capture and storage in the climate system
Climate modelling: assumptions, input data, results, sensitivity
Possible scenarios: Influence of different processes, regional climate change

Learning outcomes

- Understand the notion of climate, and the physical processes that contribute to its definition
- Critically understand the factual elements available on climate changes
- Understand how climate models are formulated, and on which assumptions and data they rely on
- Identify the possible and probable consequences (physical, economic and political) of the climate change

Independent study

Objectifs : This activity is not concerned with framed autonomy activities outside personal work.

Méthodes : This activity is not concerned with framed autonomy activities outside personal work.

Core texts

G. K. Vallis, *ESSENTIALS OF ATMOSPHERIC AND OCEANIC DYNAMICS*, Cambridge University Press, 2019
D. Archer *THE GLOBAL CARBON CYCLE*, Princeton University Press, 2010
M. L. Bender *PALEOCLIMATE*, Princeton University Press, 2013

Assessment

Final mark = 50% Knowledge + 50% Know-how
Knowledge = 100% final exam
Know-how = 100% Reports on the 3 tutorials